

**Study Guide**

For use with pages 204–209

**GOAL****Write numbers using scientific notation.****VOCABULARY**


A number is written in **scientific notation** if it has the form  $c \times 10^n$  where  $1 \leq c < 10$  and  $n$  is an integer.

**EXAMPLE 1****Writing Numbers in Scientific Notation**

- a. Write 6000 in scientific notation.

**Standard form**6000  
Move decimal point  
3 places to the left.**Product form** $6.0 \times 1000$ **Scientific notation** $6.0 \times 10^3$ **Exponent is 3.**

- b. Write 0.0000017 in scientific notation.

**Standard form**0.0000017  
Move decimal point  
6 places to the right.**Product form** $1.7 \times 0.000001$ **Scientific notation** $1.7 \times 10^{-6}$ **Exponent is -6.****EXAMPLE 2****Writing Numbers in Standard Form**

- a. Write
- $1.15 \times 10^5$
- in standard form.

**Scientific notation** $1.15 \times 10^5$ **Exponent is 5.****Product form** $1.15 \times 100,000$ **Standard form**115,000  
Move decimal point  
5 places to the right.

- b. Write
- $7.63 \times 10^{-8}$
- in standard form.

**Scientific notation** $7.63 \times 10^{-8}$ **Exponent is -8.****Product form** $7.63 \times 0.00000001$ **Standard form**0.0000000763  
Move decimal point  
8 places to the left.

## Study Guide

For use with pages 204–209

### Exercises for Examples 1 and 2

Write the number in scientific notation.

1. 0.0000523      2. 81,200      3. 985,000,000      4. 0.0001289

Write the number in standard form.

5.  $5.7 \times 10^{-7}$       6.  $3.524 \times 10^{-5}$       7.  $1.04 \times 10^3$       8.  $1.24 \times 10^6$

### EXAMPLE 3 Ordering Numbers Using Scientific Notation

Order  $7.235 \times 10^7$ ,  $8.6 \times 10^6$ , and 8,900,000 from least to greatest.

- (1) Write each number in scientific notation if necessary.

$$8,900,000 = 8.9 \times 10^6$$

- (2) Order the numbers with different powers of 10.

$$\text{Because } 10^6 < 10^7, 8.6 \times 10^6 < 7.235 \times 10^7 \text{ and } 8.9 \times 10^6 < 7.235 \times 10^7.$$

- (3) Order the numbers with the same power of 10.

$$\text{Because } 8.6 < 8.9, 8.6 \times 10^6 < 8.9 \times 10^6.$$

- (4) Write the original numbers in order from least to greatest.

$$8.6 \times 10^6; 8,900,000; 7.235 \times 10^7$$

### Exercises for Example 3

Order the numbers from least to greatest.

9.  $1.03 \times 10^9$ ;  $2.8 \times 10^7$ ; 1,035,000,000  
10.  $9.25 \times 10^{-5}$ ;  $1.08 \times 10^{-2}$ ; 0.013

### EXAMPLE 4 Multiplying Numbers In Scientific Notation

$$(2.7 \times 10^{-4})(7 \times 10^{-8}) = (2.7 \times 7) \times (10^{-4} \times 10^{-8})$$

Commutative and associative properties of multiplication

$$= 18.9 \times (10^{-4} \times 10^{-8})$$

Multiply 2.7 and 7.

$$= 18.9 \times 10^{-4 + (-8)}$$

Product of powers property

$$= 18.9 \times 10^{-12}$$

Add exponents.

$$= 1.89 \times 10^{-11}$$

Write in scientific notation.

### Exercises for Example 4

Find the product. Write your answer in scientific notation.

11.  $(1.2 \times 10^5)(8.2 \times 10^4)$       12.  $(7.2 \times 10^{-2})(3.6 \times 10^3)$